Indian Buffet Processes with Power-law Behavior

Paper 464
Poster T20

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IBPs:

Bayesian nonparametric latent variable models with an infinite number of latent variables.

This paper:

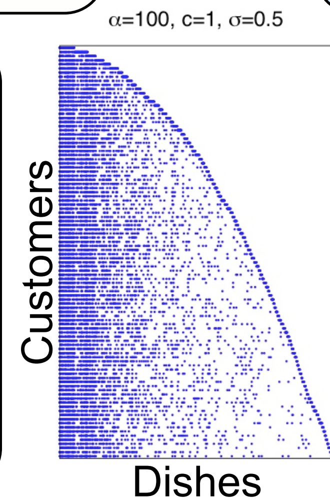
A three pararameter generalization of IBPs with power-law behavior.

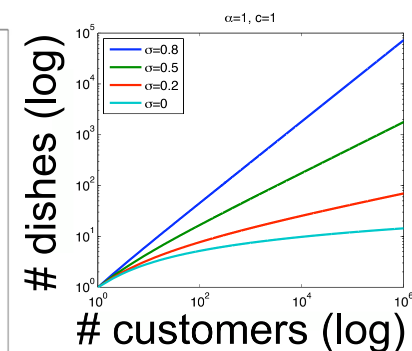
Power-law:

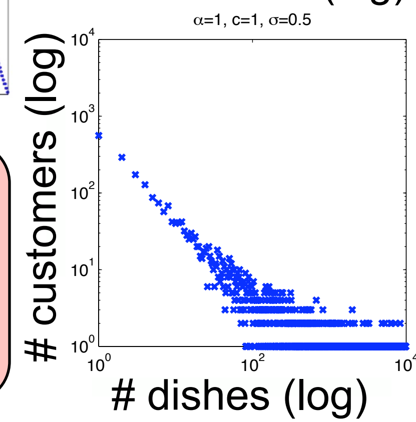
Many natural phenomena exhibit power-law properties.

IBP with parameters *α>0*, *c>-σ*, *0≤σ<1*.

- Customer *1* tries Poisson(α) dishes;
- Customer *n+1*:
  - tries dish *k* with probability $\frac{m_k-\sigma}{n+c}$;
    m_k= # customers who tried dish *k*.
  - tries Poisson($\alpha\frac{\Gamma(1+c)\Gamma(n+c+\sigma)}{\Gamma(n+1+c)\Gamma(c+\sigma)}$) new dishes.







Infinitely exchangeable. The de Finetti measure is a completely random measure called **stable-beta process.**

Representations: IBP, stable-beta, stick-breaking, size-biased.

Applied to modelling word occurrences in documents